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Practitioner's Docket No. Lewis/128529

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Aaron Lewis)	Group Art Unit: 2881
Application Number: 09/889,586)	Examiner: Kiet T. Nguyen
Filed: August 1, 2001)	
For: Deconvolving Far-Field Images Using)	
Scanned Probe Data)	

RESPONSE TO OFFICE ACTION

Mail Stop Amendment
Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant notes with appreciation the allowance of claims 11-25, and respectfully requests reconsideration of the requirement for new drawings.

First of all, it is noted that the Office Action indicates that the certified copy of the priority document has not been received. However, the present application is based on PCT/US00/4002, and the priority document was submitted in that application. The receipt of the certified copy is clearly indicated on the "Notification of Acceptance" mailed to applicant on 12 September 2001 (copy enclosed).

The drawings have been objected to under 37 CFR 1.83(a), with the assertion that they "must show every feature of the invention specified in the claims". The Office Action then asserts that various features such as a point source, a sample, a far field imager, near field microscopy movable with respect to the sample, etc. must be illustrated.

However, applicant respectfully points out that all of the claims that have been allowed are method claims, and are not directed to the structural elements spelled out in the Office Action.

Attention is directed to 37 CFR 1.81(a) which states that a drawing is required "where necessary for the understanding of the subject matter sought to be patented..." In the present case, there is no need for drawings such as those described in the Office Action, for the claimed invention is clearly understood, as evidenced by the fact that all

the claims have been allowed. Because drawings are not required for this case, the requirements of 37 CFR 1.83(a) are not controlling; instead, the prior requirements of 37 CFR 1.81(a) control.

Furthermore, since the claims are all directed to methods, applicant is not certain how the recited method steps can be illustrated. For example, claim 1 recites the step of employing near-field microscopy as a point source, and applicant inquires how the step of "employing" can be shown in a drawing. Similarly, applicant inquires how the other steps of claim 1 are to be illustrated. A particular device that could be used for near-field microscopy, for example, could be illustrated, but such a device would not illustrate the claimed method steps.

As further examples of the difficulty of meeting the drawing requirement, the Office Action asserts that the drawings should illustrate "means for recording" and "means for incorporating...data" but no such means is claimed. The Action asserts that "a closed loop as recited in claim 22" should be illustrated, but that loop is a part of a deconvolution algorithm, and the claim recites the deconvolution process. The Action also requires illustration of "data sets...as recited in claim 25", but the data sets are signals representing images, and are not appropriate for drawings.

Applicant would be pleased to try to resolve this dilemma, and requests the Examiner's assistance in establishing a way to illustrate the claimed steps. As a first suggestion, applicant submits herewith as Appendix A, a proposed new Fig. 3, which illustrates in block diagram form, without the addition of new matter, the type of equipment which might be used to carry out the claimed method steps. Attached as Appendix B is a proposed amendment to the specification, providing a description of Fig. 3. If this material is satisfactory, applicant will submit formal drawings and a formal amendment to the specification incorporating it.

It is respectfully requested that the Examiner contact the undersigned upon receipt of this material to discuss any changes that might be requested.

Respectfully submitted,
JONES, TULLAR & COOPER, P.C.

By: 

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APPENDIX B

PROPOSED AMENDMENT

Please amend page 3, lines 21-22 to read as follows:

- - performed with constraints obtained from near-field imaging data; [[and]]

Fig. 2B is a graphical illustration of the deconvolution of Fig. 2A; and

Fig. 3 is a diagrammatic illustration of equipment suitable for carrying out the method of the invention. --

Page 9, between lines 17 and 18, please insert the following;

- - Diagrammatically illustrated at 10 in Fig. 3 is equipment suitable for carrying out the above-described methodology. A scanned probe microscope 12 is positioned so that the same region of an object or sample 14 can be imaged by a scanned probe microscope 12 and a far-field imager 18 which is based on a lens 20. The sample 14 has to be put on a stage 16 that can be accurately moved relative to the scanned probe or far-field imaging devices. Both the scanned probe data and the far-field imager's data can be integrated by a processor 22 that can be used either directly or with another processor so that the recorded data can be used for computation of the final image.

- - The scanned probe microscope can be configured with a probe that is a near-field optical probe. This probe can be positioned at any point on the sample. One reason for incorporating such a probe would be to provide an on-line point source for determining a point spread function either with or without the sample in place. The

relative movement of the sample and the probe allows for multiple point spread functions at different points in the sample where the sample could perturb the point spread function in different ways. The near-field optical probe in the scanned probe microscope can not only provide point spread functions but also other optical information at various points in the sample. In addition, the near-field optical probe can be configured so that the height of these or other points on the surface of the object or sample can be correlated with the far-field optical image. Furthermore, the location of the borders of the sample can also be assessed. Such height information can also be obtained by other types of probes in the scanned probe microscope including an atomic force probe which can also provide information on the borders of the object or sample.

- - As noted, the processor records and integrates all the data, including the optical information, height information, information on the object or sample borders and/or accurate movement of the object or the sample relative to the scanned probe and/or the far field imager. This data, together with any other pertinent imaging information, can be incorporated into a deconvolution algorithm that can then use this data to produce a super-resolution deconvolved image.

- - In various embodiments of the invention, the far-field imager may include non-linear optical imaging and the image recording may include recordation of interdigitated and correlated data sets of scanned probe and far-field imaging. It is beneficial but not an absolute requirement that neither the scanned probe nor far-field imaging device obstruct viewing of the object or sample from one or the other device. - -

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